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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/051,987	01/16/2002	Sooyoul Hong	155634-0131	9184

1622 7590 10/09/2003

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EXAMINER	
KINDER, DARRELL D	

ART UNIT	PAPER NUMBER
2862	

DATE MAILED: 10/09/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/051,987	HONG ET AL.	
	Examin r	Art Unit	
	Darrell Kinder	2862	

-- The MAILING DATE of this communication appears on the cov r sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 September 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-10* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-10* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *26 January 2003* is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

1. Applicant's request for reconsideration of the finality of the rejection of the last Office action is persuasive and, therefore, the finality of that action is withdrawn.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

2. Claims 1-3 and 6-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhang et al. "Thermal Decay in High Density Disk Media," IEEE Transactions on Magnetics, vol. 34, no. 5 September 1998 pages 3786-3793 (Zhang), in view of U.S. Patent no. 6,483,300 (Severson) and U.S. Patent no. 6,570,378 (Goh).

Referring to claim 1, Zhang discloses a test stand for testing a thermal decay of a disk of a hard disk drive comprising: a spindle motor that can spin the disk (paragraph 4); a head coupled to the disk (paragraph 4); a controller connected to said head, said controller operates in accordance with a procedure that writes a reference signal onto a

reference track (paragraph 7) of the disk, and then reduces an amplitude of the reference signal (paragraph 7), writes a test signal onto the disk (paragraph 7), reads the test signal, reads the reference signal, and normalizes the signal with the reference signal (paragraph 10).

Zhang does not disclose that the test stand includes a heating element or that the method and procedure includes a step wherein the disk is heated by a heating element. Zhang does not further disclose that the amplitude of the reference track is actively reduced.

Severson discloses a spin stand, which further includes a disk heater (col. 2 lines 2-3). Severson teaches that the heater is useful in accelerating aging studies on the disk by applying thermal energy to the disk (col. 2 lines 38-45).

One of ordinary skill in the art would have looked to Severson to modify Zhang, as they are analogous art, concerning the testing of disks. Further more one of ordinary skill in the art would have been motivated to modify Zhang with Severson such that the test stand included a heater in order to perform aging and worst-case tests which are accelerated, as Zhang's tests take 15+ hours, and would be benefited by a shorter time span.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the stand and method of Zhang such that a heater was used to heat the disk and perform accelerated aging and worst-case tests as it would have accelerated the testing procedure of Zhang, resulting in a more efficient test stand and method.

Furthermore, Goh discloses a method for determining the amplitude decay rate of a magnetic storage medium, wherein a DC erase current is used to actively reduce the amplitude of a signal (col. 2 lines 27-58). Goh teaches that the use of the DC erase signal helps to accelerate the test process significantly (col. 1 lines 37-44). A DC erase signal could therefore be used to reduce the amplitude of any signal, reference or test, and provide a more efficient testing means.

One of ordinary skill in the art would have looked to Goh to modify Zhang, or Zhang-Severson, as all are analogous art, concerning magnetic medium testing. Furthermore one of ordinary skill in the art would have been motivated to modify Zhang, or Zhang-Severson with the teachings of Goh, such that a DC erase current was used to actively reduce the amplitude of the reference track signal, as it would further accelerate the aging process, and the testing process, enabling a more efficient, expedited testing process.

3. Referring to claims 2, although the combination of Zhang-Severson does not disclose that the amplitude is reduced with a DC erasing current, Goh teaches the active reduction of the amplitude by use of a DC erase current (col. 2 lines 27-58). Goh teaches that the DC erase current is useful in expediting the amount of time needed to perform a decay test (col. 1 lines 37-44).

One of ordinary skill in the art would have been motivated to use a DC erase current to actively reduce the amplitude, as a DC erase current is old and well known in the art, and also as taught by Goh, useful in expediting amplitude decay tests.

4. Referring to claims 3, the combination of Zhang-Severson-Goh does not explicitly disclose that the amplitude of the test signal is reduced to 60%-80% of peak value. However this is an arbitrary range, and it is not seen why this range is more beneficial than any other range of values that the amplitude could be reduced to. One of ordinary skill in the art could easily have modified the stand and procedure of Zhang-Severson-Goh such that the amplitude was reduced to 60-80% of peak value without undue experimentation as such a range of values may produce results that are more favorable, or easier to analyze, or most accurately characterize the thermal and performance decay of the disk.

Furthermore, the courts have held that no invention is involved in discovering optimum ranges of a process by routine experimentation. *In re Aller*, 220 F.2d 454, 456, 458, 105 USPQ 233, 235 (CCPA 1955). This is unless a claimed range is critical to the invention, showing unexpected results in comparison with any prior art range. *In re Peterson* 315, F.3d 1325, 1330-1331 (Fed. Cir. 2003).

5. Claims 4-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhang-Severson-Goh as applied to claim 1 above, and further in view of U.S. Patent no. 6,483,299 (Pressesky).

Referring to claim 4, the combination of Zhang-Severson-Goh, by way of the teachings of Severson, do not state that the heating portion is a laser that directs a laser beam onto a portion of the disk.

However, a laser beam is old and well known as a thermal source. Furthermore, Pressesky discloses a method and procedure for determining the magnetic properties of

magnetic media wherein a thermal source is used, and said thermal source is a laser beam (col. 2 lines 42-56). Pressesky use the laser beam as the thermal source as it allows for a localized temperature change, only heating a certain portion of the disk (col. 2 lines 30-32).

One of ordinary skill in the art would have looked to Pressesky to modify the combination of Zhang-Severson-Goh, as it is also analogous art: in the art of testing magnetic media (i.e. disks). Furthermore, one of ordinary skill in the art would have been motivated to modify the combination of Zhang-Severson-Goh with the teachings of Pressesky such that the thermal source is a laser, as it would have allowed the localized heating of the disk, so that only the area of the disk containing the reference and/or test tracks could be subjected to heating. This would improve the efficiency of the test by eliminating the unnecessary heating of parts of the disk that are not important to the test.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the combination of Zhang-Severson-Goh with the teachings of Pressesky such that the heating element is a laser in order to improve the efficiency of the test.

6. Referring to claim 5, the combination of Zhang-Severson-Goh, by way of the thermal source of Severson, discloses a test stand and procedure wherein said head is on a first surface and the heating element, which could be a laser from the teachings of Pressesky above, is directed onto an opposite second surface of the disk (**Fig. 3** heater 200; head 144; disk 106).

7. Claims 6-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhang in view of Pressesky and Goh.

Referring to claim 6, Zhang discloses a method for testing a decay of a disk of a hard disk drive comprising: writing a reference signal onto a reference track of the disk (paragraph 7); writing a test signal onto the disk (paragraph 7); reducing an amplitude of the reference signal (paragraph 7); reading the reference signal (paragraph 7); and normalizing the test signal with the reference signal (paragraph 10).

Zhang does not explicitly disclose that the amplitude of the reference signal is actively reduced; letting the disk spin for 15+ hours reduces the amplitude. Zhang also does not disclose that a portion of the disk is heated and that the test signal is read from the heated portion of the disk.

Goh discloses a method for determining the amplitude decay rate of a magnetic storage medium, wherein a DC erase current is used to actively reduce the amplitude of a signal (col. 2 lines 27-58). Goh teaches that the use of the DC erase signal helps to accelerate the test process significantly (col. 1 lines 37-44). A DC erase signal could therefore be used to reduce the amplitude of any signal, reference or test, and provide a more efficient testing means.

One of ordinary skill in the art would have been motivated to modify Zhang, with the teachings of Goh, such that a DC erase current was used to actively reduce the amplitude of the reference track signal, as it would further accelerate the amplitude reduction and the testing process, making it significantly less than 15+ hours, enabling a more efficient, expedited testing process.

Furthermore, Pressesky discloses a method and procedure for determining the magnetic properties of magnetic media wherein a thermal source is used, and said thermal source is a laser beam (col. 2 lines 42-56). Pressesky uses the laser beam as the thermal source as it allows for a localized temperature change, only heating a certain portion of the disk (col. 2 lines 30-32). The use of the localized thermal source also effectively lowers the coercivity of the magnetic medium, thus assisting the magnetic transitions, which is the writing process (col. 5 lines 1-2, 25-33).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have further modified the method of Zhang such that a portion of the disk was heated, and that the test signal was read from the heated portion, as it would have provided a means for effectively reducing the coercivity of the disk in a localized area, thus assisting in the transitions of the disk in a localized area, facilitating the writing of a test/reference signal, which can then be read for determining the properties of the magnetic media. The thermal assist allows the method to be performed in a more economical and expedited fashion.

8. Referring to claim 7, Goh teaches the active reduction of the amplitude by use of a DC erase current (col. 2 lines 27-58). Goh teaches that the DC erase current is useful in expediting the amount of time needed to perform a decay test (col. 1 lines 37-44).

One of ordinary skill in the art would have been motivated to use a DC erase current to actively reduce the amplitude, as a DC erase current is old and well known in the art, and also as taught by Goh, useful in expediting amplitude decay tests.

9. Regarding claim 8, the combination of Zhang-Goh-Pressesky does not explicitly disclose that the amplitude of the test signal is reduced to 60%-80% of peak value. However this is an arbitrary range, and it is not seen why this range is more beneficial than any other range of values that the amplitude could be reduced to. One of ordinary skill in the art could easily have modified the stand and procedure of Zhang-Goh-Pressesky such that the amplitude was reduced to 60-80% of peak value without undue experimentation as such a range of values may produce results that are more favorable, or easier to analyze, or most accurately characterize the thermal and performance decay of the disk.

Furthermore, the courts have held that no invention is involved in discovering optimum ranges of a process by routine experimentation. *In re Aller*, 220 F.2d 454, 456, 458, 105 USPQ 233, 235 (CCPA 1955). This is unless a claimed range is critical to the invention, showing unexpected results in comparison with any prior art range. *In re Peterson* 315, F.3d 1325, 1330-1331 (Fed. Cir. 2003).

10. Referring to claim 9, the combination of Zhang-Goh-Pressesky, by means of the laser source heating assembly of Pressesky discloses a method wherein the disk is heated with a laser beam (col. 5 lines 45-48).

11. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zhang-Goh-Pressesky as applied to claim 9 above, and further in view of Severson.

Referring to claim 10, the combination of Zhang-Goh-Pressesky does not explicitly disclose that the method includes reading the test signal with a head located

adjacent to a first surface of the disk, and the laser beam (of Pressesky) is directed onto an opposite second surface of the disk.

Severson discloses a test stand and procedure wherein said head is on a first surface and the heating element, is directed onto an opposite second surface of the disk (**Fig. 3** heater 200; head 144; disk 106). Severson teaches that heating the opposite surface opposed to the head is advantageous because it reduces heat that is transferred to the spindle (col. 5 lines 3-12).

One of ordinary skill in the art would have bee motivated to modify the combination of Zhang-Goh-Pressesky with the teaching of Severson such that the laser heating source was directed onto an second surface opposite the head in order to reduce heat that is transferred to the spindle of the testing instrument (Zhang paragraph 4), thereby protecting the test device, and furthering the life of the test device and method.

Response to Arguments

12. Applicant's arguments filed 16 September 2003 have been fully considered but they are not persuasive. Applicant argues that the teaching of Goh teaches away from the present invention because the disclosure of Goh indicates that the test track amplitude is reduced as opposed to the reference track of the present invention. The teaching of Goh demonstrates that a signal written onto a disk can be quickly reduced using a DC erase current. The primary reference, Zhang, discloses a method and device which reduces the amplitude of a reference signal by simply letting the disk spin for a period of 15 or more hours. One of ordinary skill in the art would see the teaching

of Goh demonstrating a process that can be used to expedite the reduction process of Zhang, and would be motivated to use the DC erase current to reduce the reference signal of Zhang to enable an active reduction scheme that takes significantly less time than the 15 or more hours currently required by Zhang. The teaching therefore does not teach away from the present invention, as it provides a means for enhancing Zhang by providing a desirable outcome: a significantly shorter amplitude reduction time.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Darrell Kinder whose telephone number is (703) 305-3303. The examiner can normally be reached on Monday-Friday 6:30-4:00, alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, N. Le can be reached on (703) 308-0750. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

dk DK

N. Le
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